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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,200	07/11/2001	Christopher S. Chen	56252	1223
21874	7590	03/28/2006	EXAMINER	
EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205			NAFF, DAVID M	
			ART UNIT	PAPER NUMBER
			1651	
DATE MAILED: 03/28/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/904,200

Applicant(s)

CHEN ET AL.

Examiner

David M. Naff

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 64-68, 70-80, 83-92, 94 and 95 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 64-68, 70-80, 83-92, 94 and 95 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for  
5 continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/28/05 has been entered.

10 An amendment submitted 12/28/05 amended claims 64, 94 and 95, and canceled claim 93.

Claims examined on the merits are 64-68, 70-80, 83-92, 94 and 95, which are all claims in the application.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

15 ***Claim Rejections - 35 USC § 103***

Claims 64-68, 70-80, 83-92, 94 and 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singhvi et al (6,368,838 B1) in view of Dewez et al (WO 96/15223) and Anderson et al (6,686,184 B1).

20 The claims are drawn to a device containing a substrate having thereon a plurality of cytophilic regions that can adhere biomolecules and cytophobic regions to which the biomolecules do not adhere, and the cytophobic regions contain a surfactant compound. The substrate comprises a polymeric surface and the surface may comprises  
25 microfluidic channels.

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Singhvi et al disclose a device having cytophilic islands for adhering cells and cytophobic regions which isolate the cytophilic islands. The cytophilic islands may contain extracellular matrix proteins (col 9, lines 32-33) to promote binding of cells (col 9, lines 22-26).

Dewez et al disclose a biomaterial for selective adhesion of cells or tissue which contains a polymeric support having a heterogeneous surface conditioned with a surfactant and an extracellular matrix protein. The extracellular matrix protein adheres to one surface area of the support and the surfactant adheres to another surface area where it inhibits adsorption of the extracellular matrix protein (paragraph bridging pages 3 and 4). Cells preferentially adhere to the portion of the support containing the extracellular matrix protein (page 4, lines 12-16).

Anderson et al disclose patterning surfaces using a stamp containing microfluidic channels.

It would have been obvious to provide the cytophilic islands of the device of Singhvi et al with extracellular matrix protein to enhance the binding of cells as suggested by Singhvi et al and Dewez et al, and it would have been obvious to provide the cytophobic regions of Singhvi et al with a surfactant to inhibit binding of extracellular matrix protein to these regions as suggested by Dewez et al. It would have been further obvious to provide the device of Singhvi et al with microfluidic channels to obtain the function of these channels in patterning a surface as disclosed by Anderson et al since the device of Singhvi et al can be used for patterning a surface as shown by Figure 1. The conditions of dependent claims would have

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been matters of obvious choice within the skill of the art in view of the disclosures of the references. The surfactant of Dewez et al can be a polyethylene oxide (page 19, 5). Selecting another known surfactant that provides the same function would have been obvious.

5 The devices of Singhvi et al and Dewez et al can have various forms and shapes and to provide channels as claimed by claims 81 and 82 would have been obvious. As to claims 91 and 92, the surface of Singhvi et al can be made of plastic or polysulfone compounds (col 8, lines 44-45). Polysulfones are hydrophobic. Selecting other polymers  
10 that provide the same function would have been obvious.

#### ***Response to Arguments***

Applicant's arguments filed 12/28/05 have been fully considered but they are not persuasive.

15 Applicants urge that Singhvi et al fail to teach a polymeric surface, cytophobic regions formed of surfactant compounds and microfluidic channels on the polymeric surface. However, Singhvi et al disclose that the surface can be formed of a plastic or polymer (col 8, lines 44-50). The claims do not exclude a self-assembled  
20 monolayer (SAM) on the surface, and the present specification discloses (page 8, lines 28-30, and page 15, lines 8-15) that SAMs can be used to form the cytophilic and cytophobic regions. The present specification discloses that there is no criticality in the surface material, and the surface material can be organic or inorganic and  
25 lists inorganic and polymer materials (paragraph bridging pages 17 and 18). It would have been obvious to adsorb a surfactant on a

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cytophobic SAM or substitute a hydrophobic surfactant for the SAM to prevent extracellular matrix protein from adsorbing on the surface in a similar way that Dewez et al adsorb a surfactant on a hydrophobic surface. Moreover, it would have been obvious to use a surfactant to form a cytophobic SAM since Dewez et al disclose (page 5, lines 16-19) that the surfactant can contain a polyethylene oxide group and Singhvi et al disclose that a biophobic SAM can contain a polyethylene glycol group (col 9, line 60). As to microfluidic channels, it would have been obvious to provide the channels on the surface to obtain the function of the channels as obtained by Anderson et al. The rejection is not based on Singhvi et al alone but on Singhvi et al in combination with Dewez et al and Anderson et al. The present invention is merely a combination of prior art techniques where each is functioning as would be expected from the teachings of references applied. An unexpected result is not seen in the presently claimed modification of Singhvi et al.

Applicants urge that a device has been provided with a surfactant as a non-adhesive agent on a surface that remains bare or uncovered by a binding agent. However, the claims do not require a surface without a binding agent, and the present specification fails to disclose that a binding agent for the surfactant should not be on the surface. Moreover, it would have been apparent from Dewez et al that a binding agent is not required for a surfactant to be adsorbed to a polymeric surface.

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Applicants urge that there is no motivation to modify the cytophobic region of Singhvi et al with a surfactant since the region is already cytophobic. However, when using an extracellular matrix protein for binding cells as disclosed by Dewez et al, one would have been motivated to use a surfactant to inhibit binding of the extracellular matrix protein to certain regions to which cells are to be adsorbed. The present specification discloses that extracellular matrix protein can be used for an adhesive to bind cells. For example, see page 9, lines 1-5, and page 13, lines 29-30.

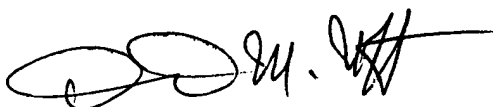
#### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is 571-272-0920. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David M. Naff  
Primary Examiner  
Art Unit 1651

DMN

3/17/06